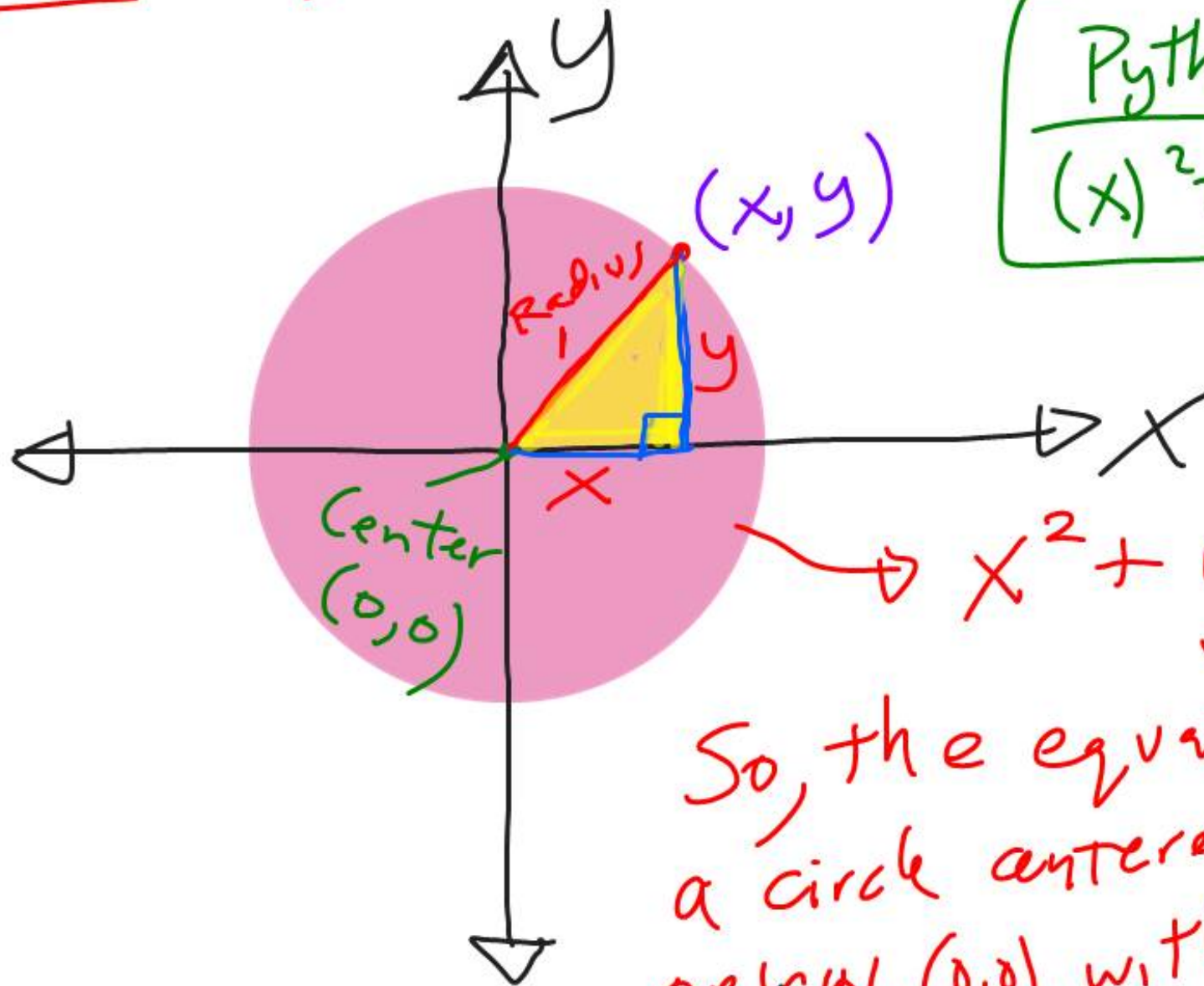


Sec 9.6 Equations of Circles.

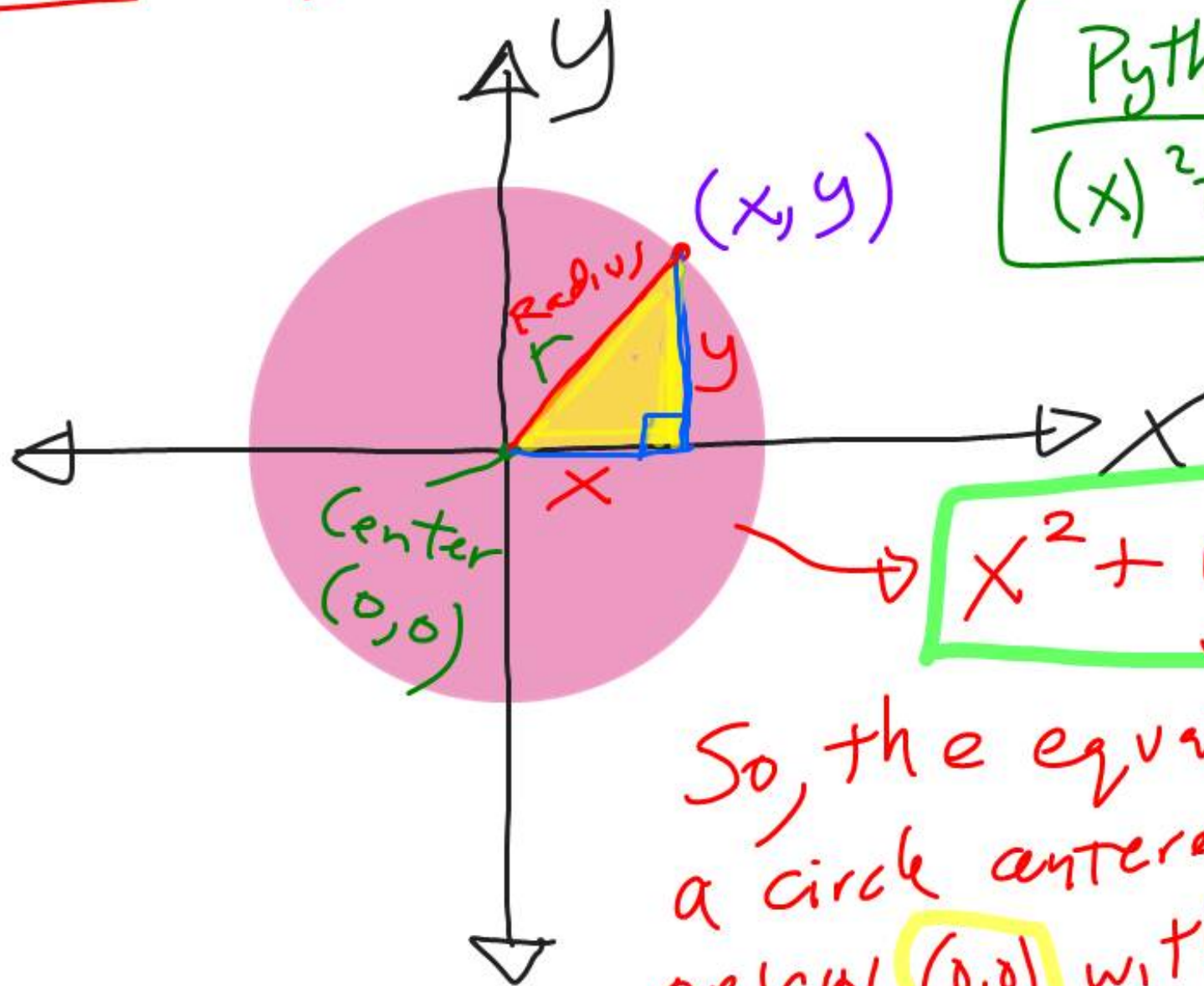


Pythagorean Thm
$(x)^2 + (y)^2 = (\text{hyp})^2$

$$\rightarrow x^2 + y^2 = 1^2$$

So, the equation for a circle centered at the origin (0,0) with a radius length of 1 is $x^2 + y^2 = 1$.

Sec 9.6 Equations of Circles.

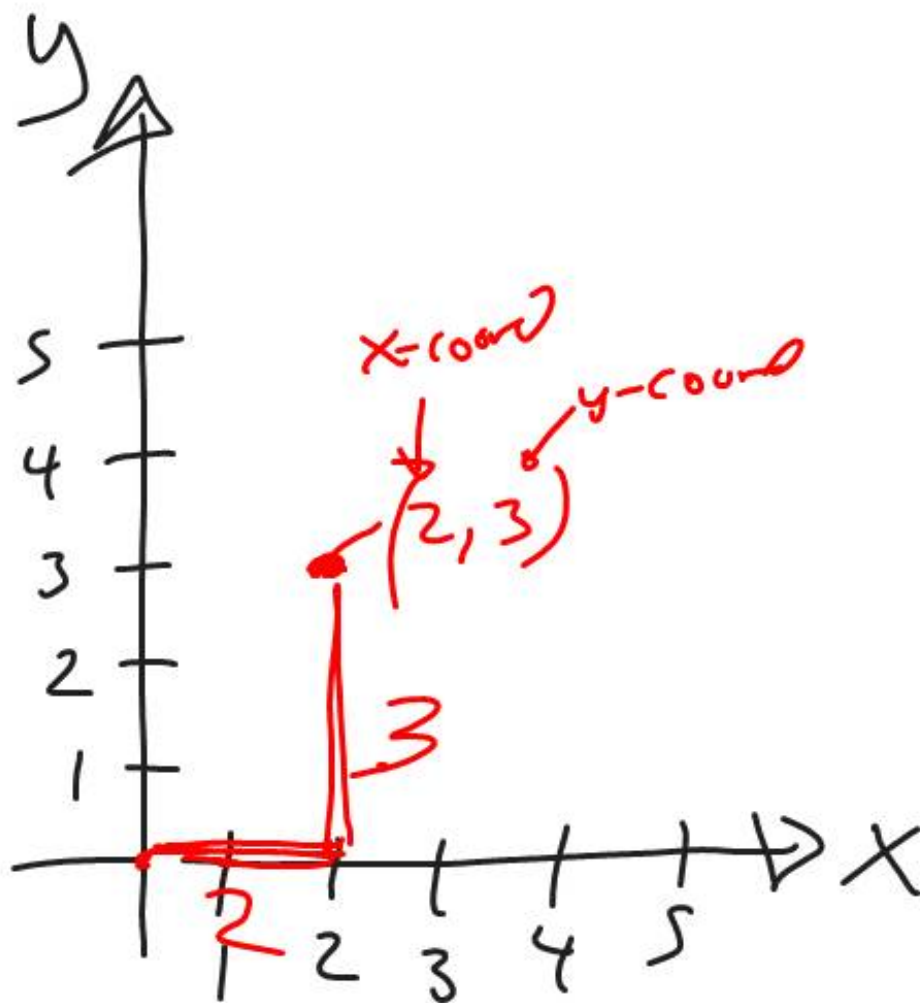


Pythagorean Thm

$$(x)^2 + (y)^2 = (\text{hyp})^2$$

$$x^2 + y^2 = r^2$$

So, the equation for a circle centered at the origin $(0,0)$ with radius length of r is $x^2 + y^2 = r^2$.



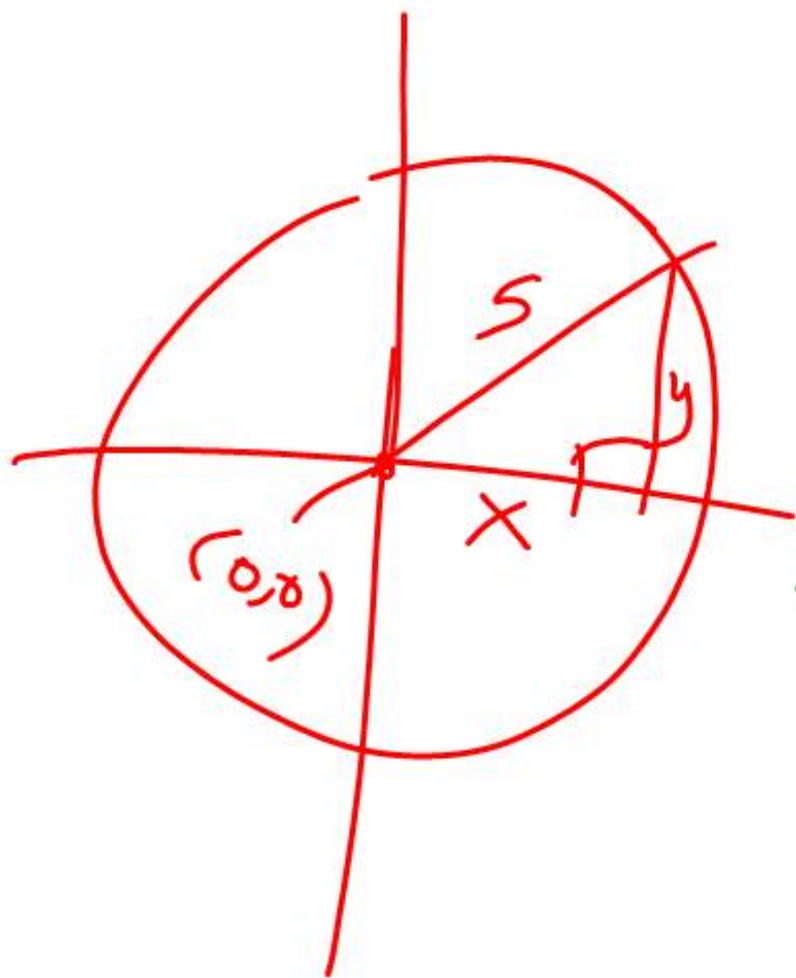
x-count
y-count
(2, 3)

$$x^2 + y^2 = r^2$$

$$x^2 + y^2 = \boxed{5}^2$$

radius

$$\boxed{x^2 + y^2 = 25}$$



□ what is the radius length?

□ Where is the center?

$$x^2 + y^2 = 49$$

$$x^2 + y^2 \approx 42$$

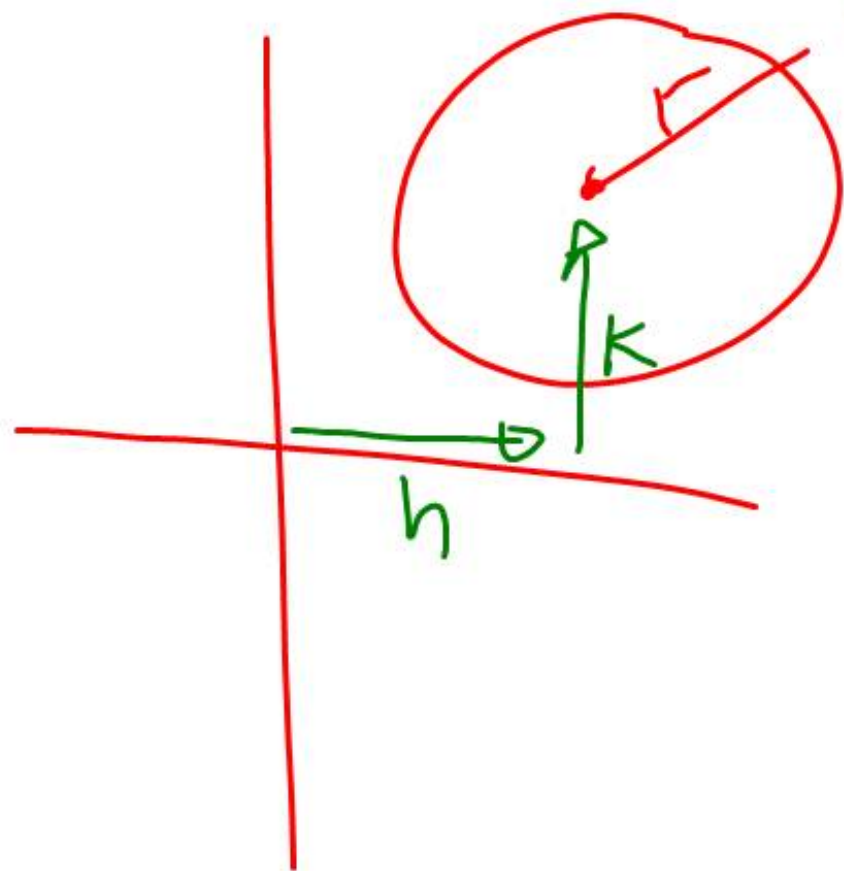
□ Center (,)

□ Radius =

Center: (0, 0)
Radius = 7

Center: (0, 0)
radius = $\sqrt{42} \approx 6.4$
Exact Approx

$$\begin{array}{c} \sqrt{42} \\ \swarrow \quad \searrow \\ \sqrt{2} \cdot \sqrt{21} \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ \sqrt{2} \cdot \sqrt{3} \cdot \sqrt{7} \end{array}$$



Left/Right
↓ shift

Up/down
↓ shift

$$(x - h)^2 + (y - k)^2 = r^2$$

where

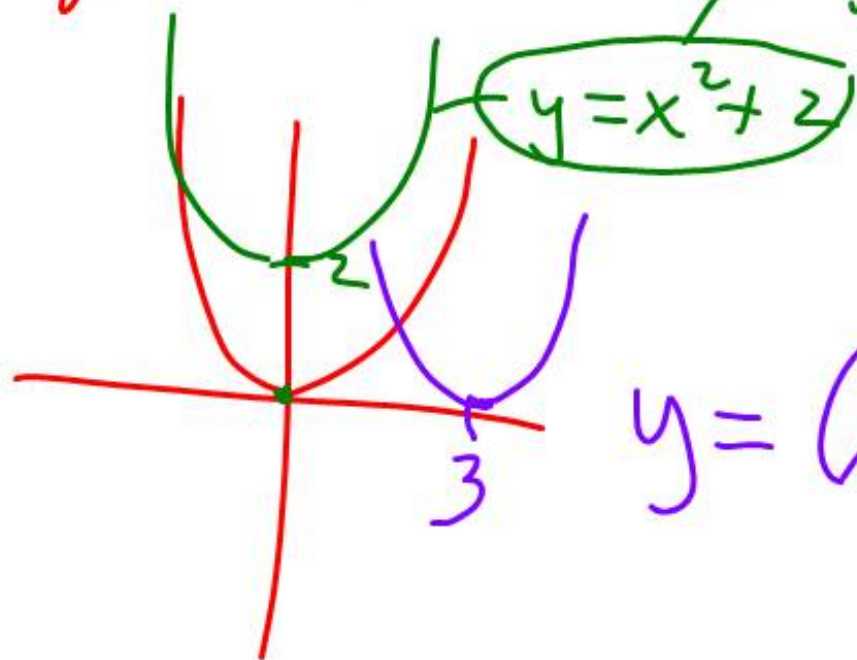
Center (h, k)

radius = r

$$y = x^2$$

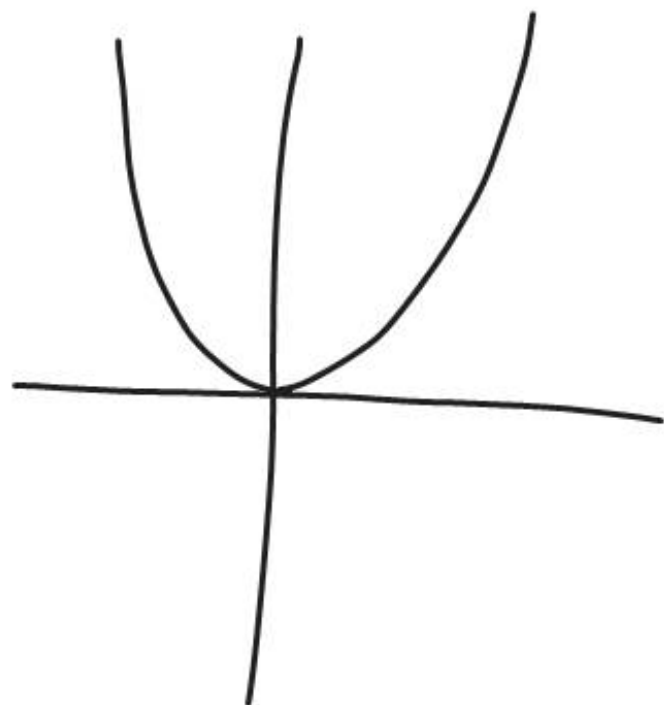
$$(y) = (x)^2$$

$$\begin{array}{r} (y-2) = (x)^2 \\ +2 \quad +2 \\ \hline y = x^2 + 2 \end{array}$$

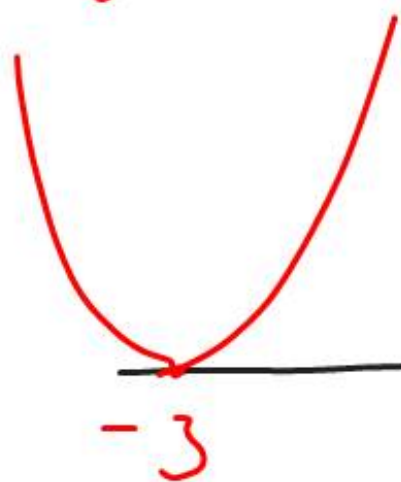


$$y = (x-3)^2$$

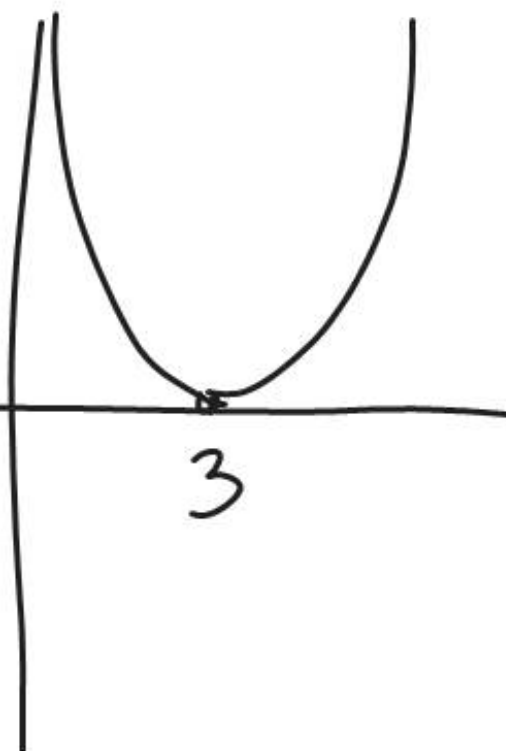
$$y = x^2$$

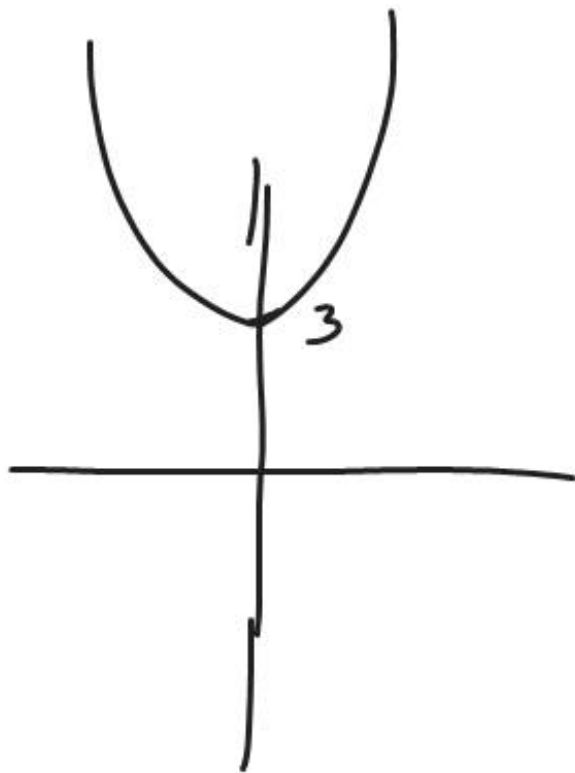


$$y = (x - -3)^2$$



$$y = (x - 3)^2$$





$$y = x^2$$

$$\begin{array}{r} (y-3) = x^2 \\ +3 \quad +3 \\ \hline y = x^2 + 3 \end{array}$$

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(2, -3)$$

$$r=5$$

$$(x - \overset{h}{\boxed{2}})^2 + (y - \overset{k}{\boxed{-3}})^2 = 5^2$$

□ Center $(\overset{h}{2}, \overset{k}{-3})$

□ radius = 5

Center: $(7, -10)$
radius: 9

$$(x - 7)^2 + (y - (-10))^2 = (9)^2$$

$$(x - 7)^2 + (y + 10)^2 = 81$$

center: $(-3, -14)$

radius: $\sqrt{3}$

$$(x - (-3))^2 + (y - (-14))^2 = (\sqrt{3})^2$$

$$(x + 3)^2 + (y + 14)^2 = 3$$

$$(x-5)^2 + (y-7)^2 = 36$$

□ Center (,)

□ radius =

$$(x-5)^2 + (y-7)^2 = 36 = 6^2$$

□ Center (5, 7)

□ radius = 6

$$(x+4)^2 + (y-8)^2 = 100 = 10^2$$

□ Center (-4, 8)

□ Radius = 10

$$2 + 7 =$$

$$(x+4)^2 + (y-8)^2 = 100$$

$$(x - \text{center}_x)^2 + (y - \text{center}_y)^2 = (\text{radius})^2$$

□ center $(-4, 8)$

□ radius = 10

$$1 - 2 =$$

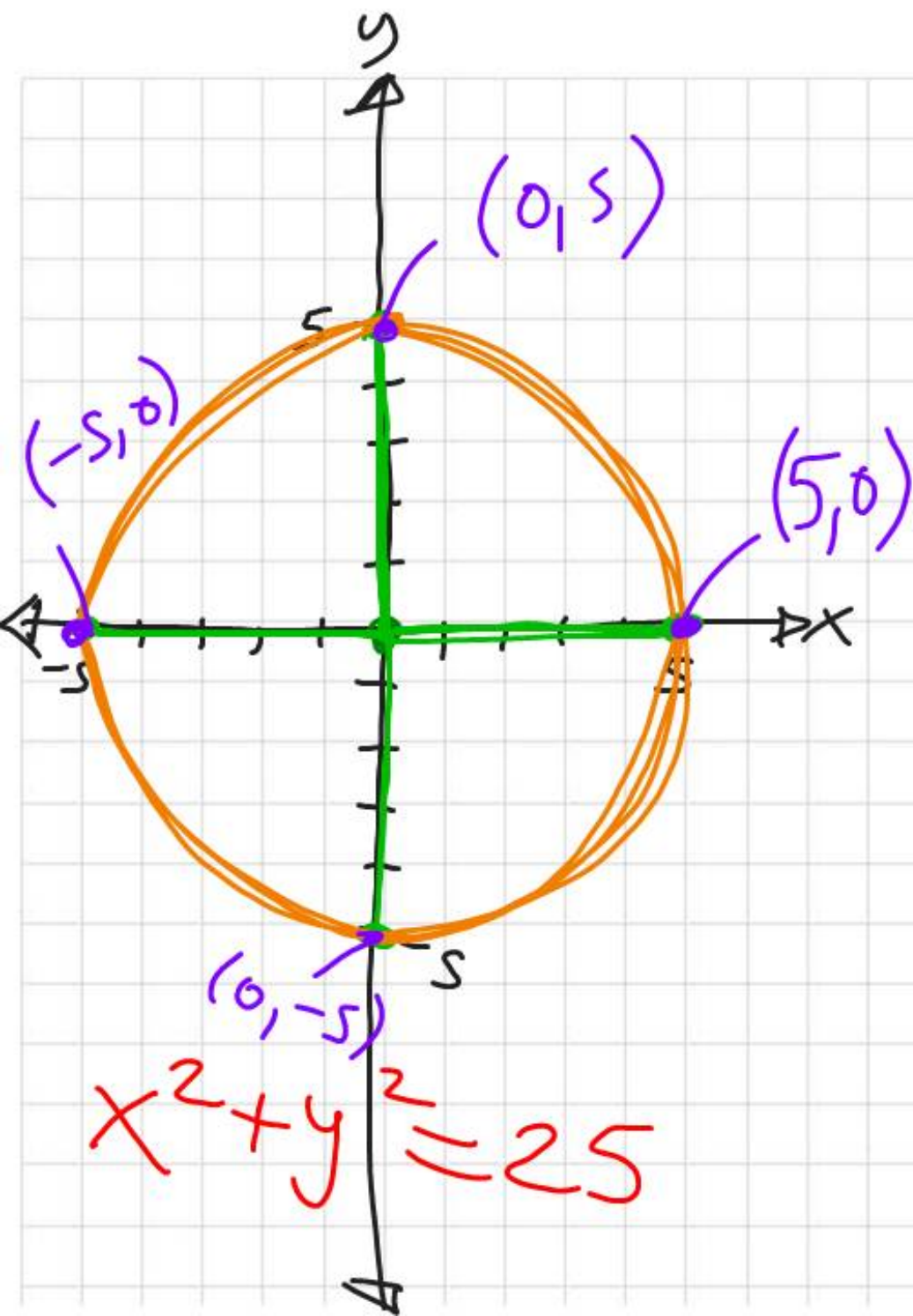
$$1 + 2 = 3$$

$$(x - \text{[redacted]})^2$$

$$(x + 4)^2$$

$$(x - -4)^2$$

$$1 + +2 = +3$$
$$1 + 2 = 3$$



$$x^2 + y^2 = 25 = \overset{\text{radius}}{\downarrow} (5)^2$$

□ Center = $(0, 0)$

□ radius = 5

x-intercepts

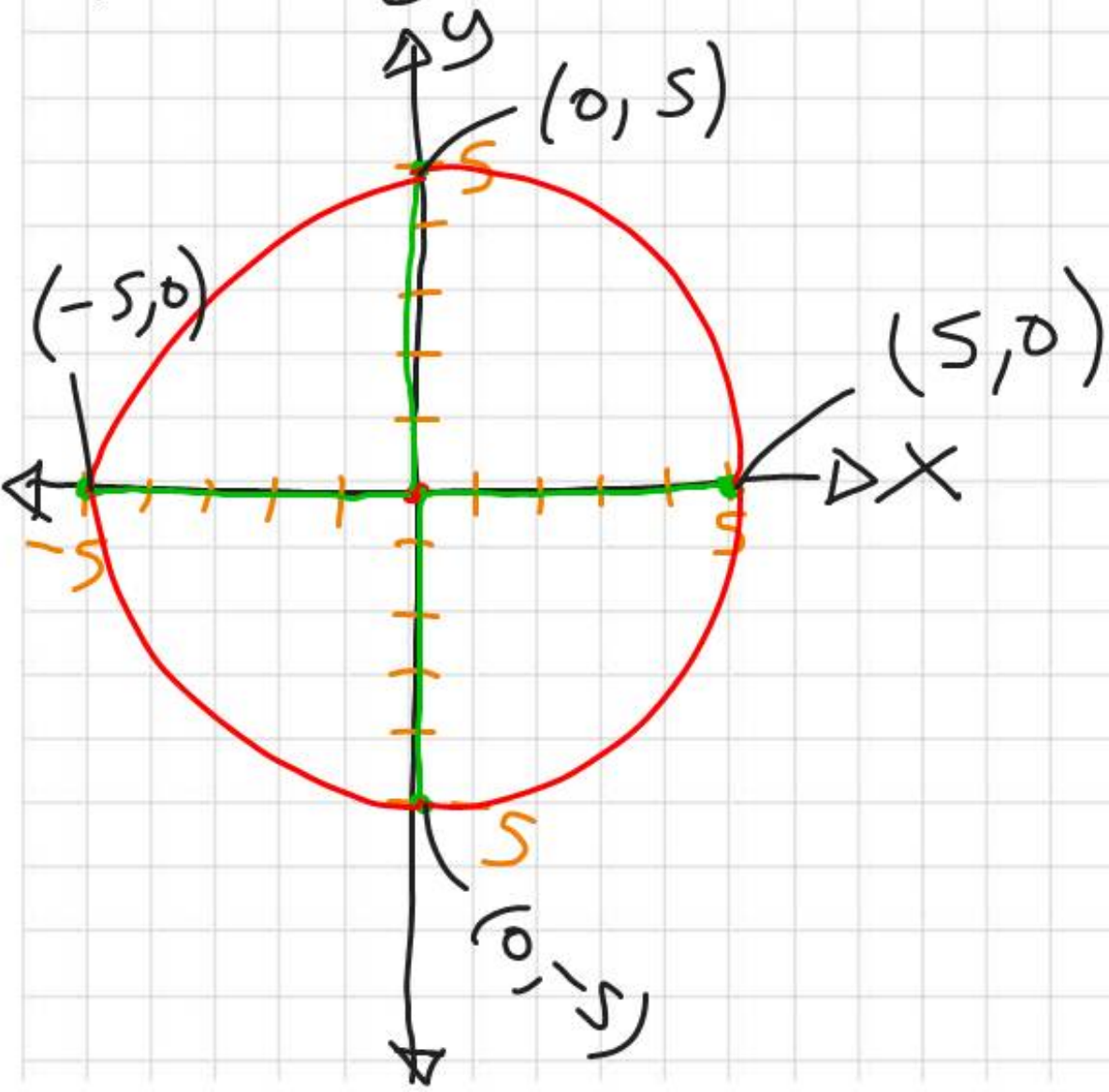
$(5, 0) \text{ \& } (-5, 0)$

y-intercepts

$(0, 5) \text{ \& } (0, -5)$

SKETCH:

$$x^2 + y^2 = 25$$



Find the
x-intercepts

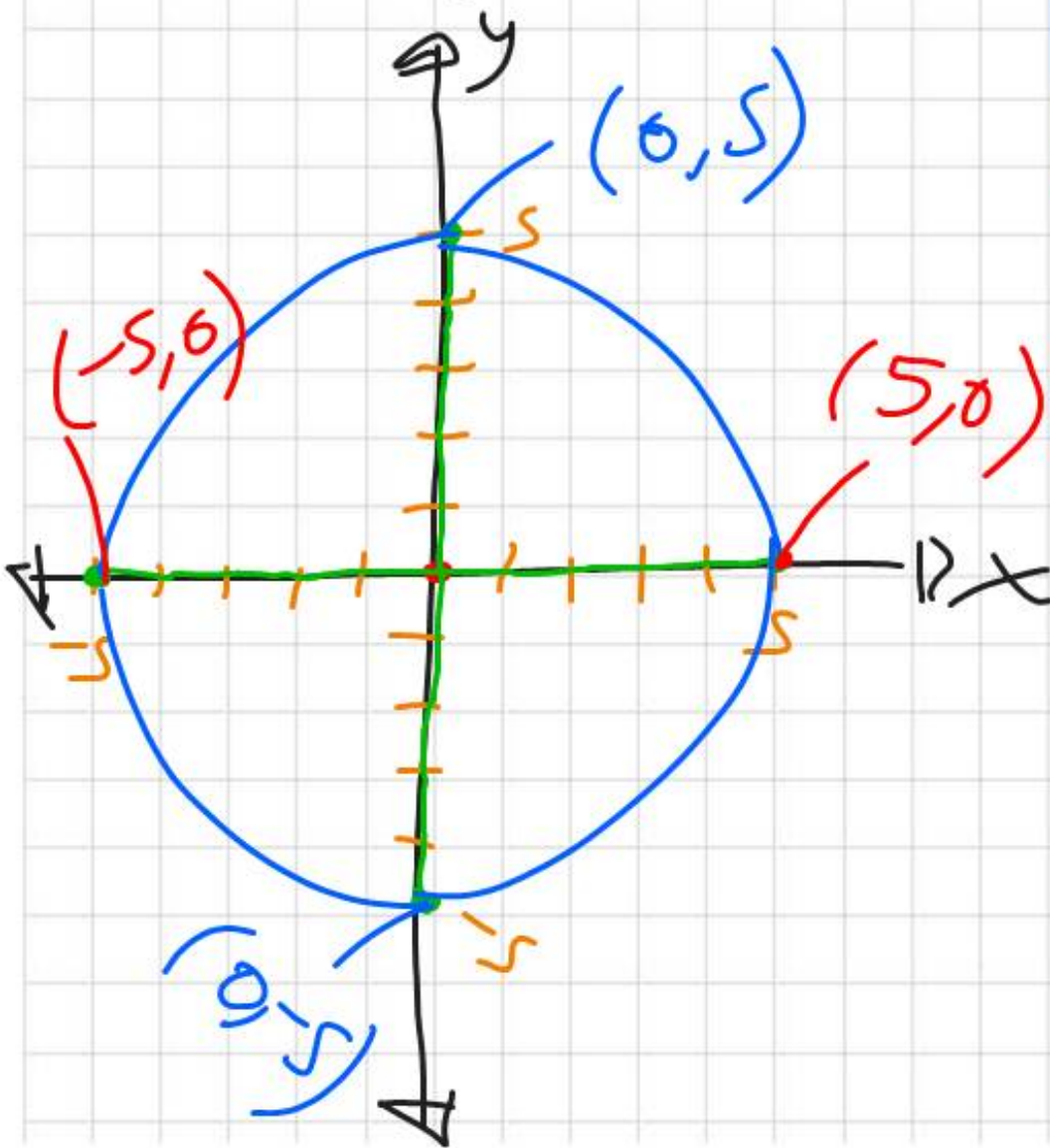
$$(-5, 0) \text{ and } (5, 0)$$

Find the
y-intercepts

$$(0, 5) \text{ and } (0, -5)$$

Sketch:

$$x^2 + y^2 = 25$$



$$\text{Let } y=0$$

x-intercepts

$$(5,0) \text{ and } (-5,0)$$

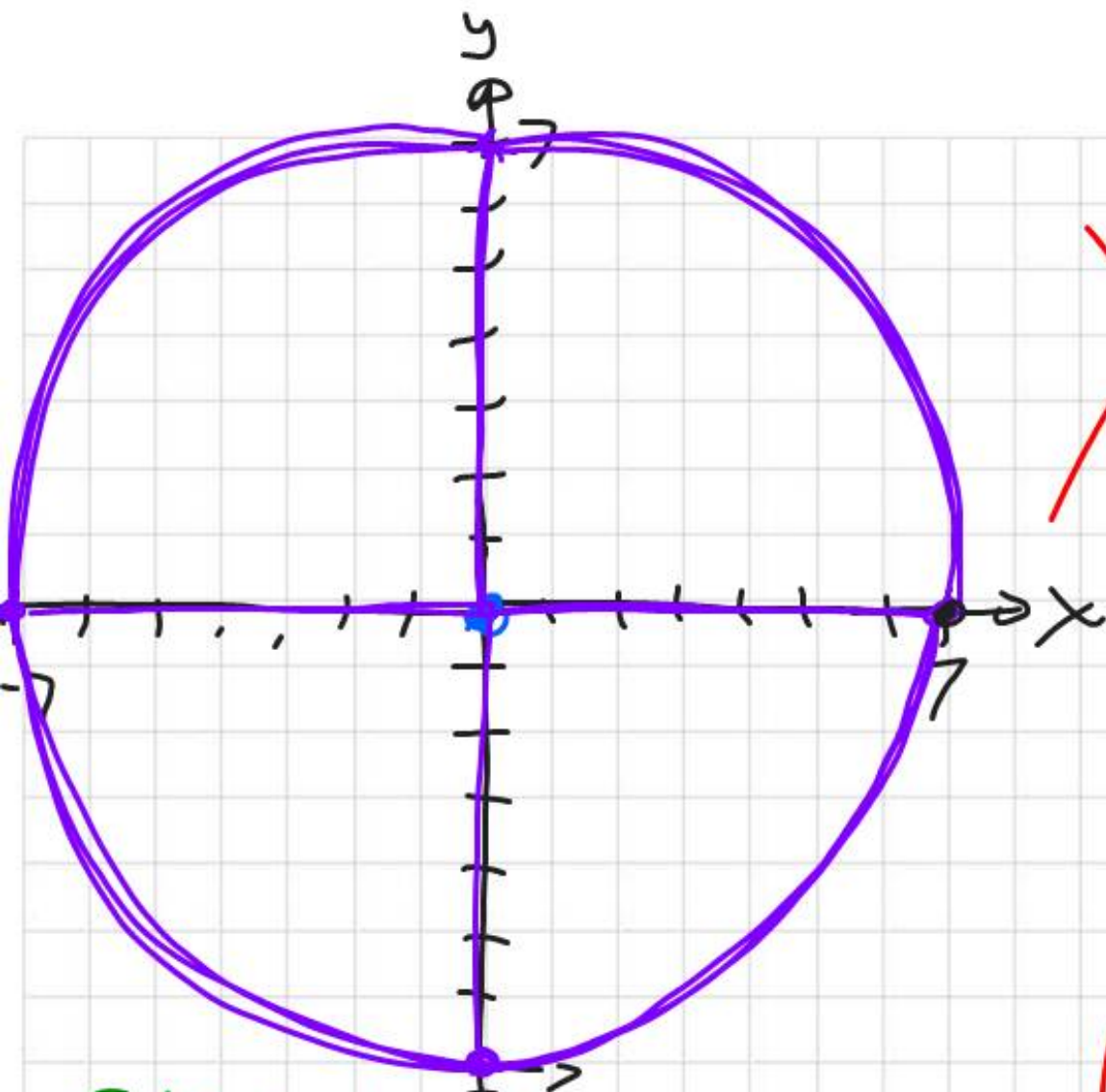
$$\text{Let } x=0$$

y-intercepts

$$(0,5) \text{ and } (0,-5)$$

SKETCH

$$x^2 + y^2 = 49$$



Sketch the Circle

$$x^2 + y^2 = 49$$

$$x^2 + y^2 = 49$$

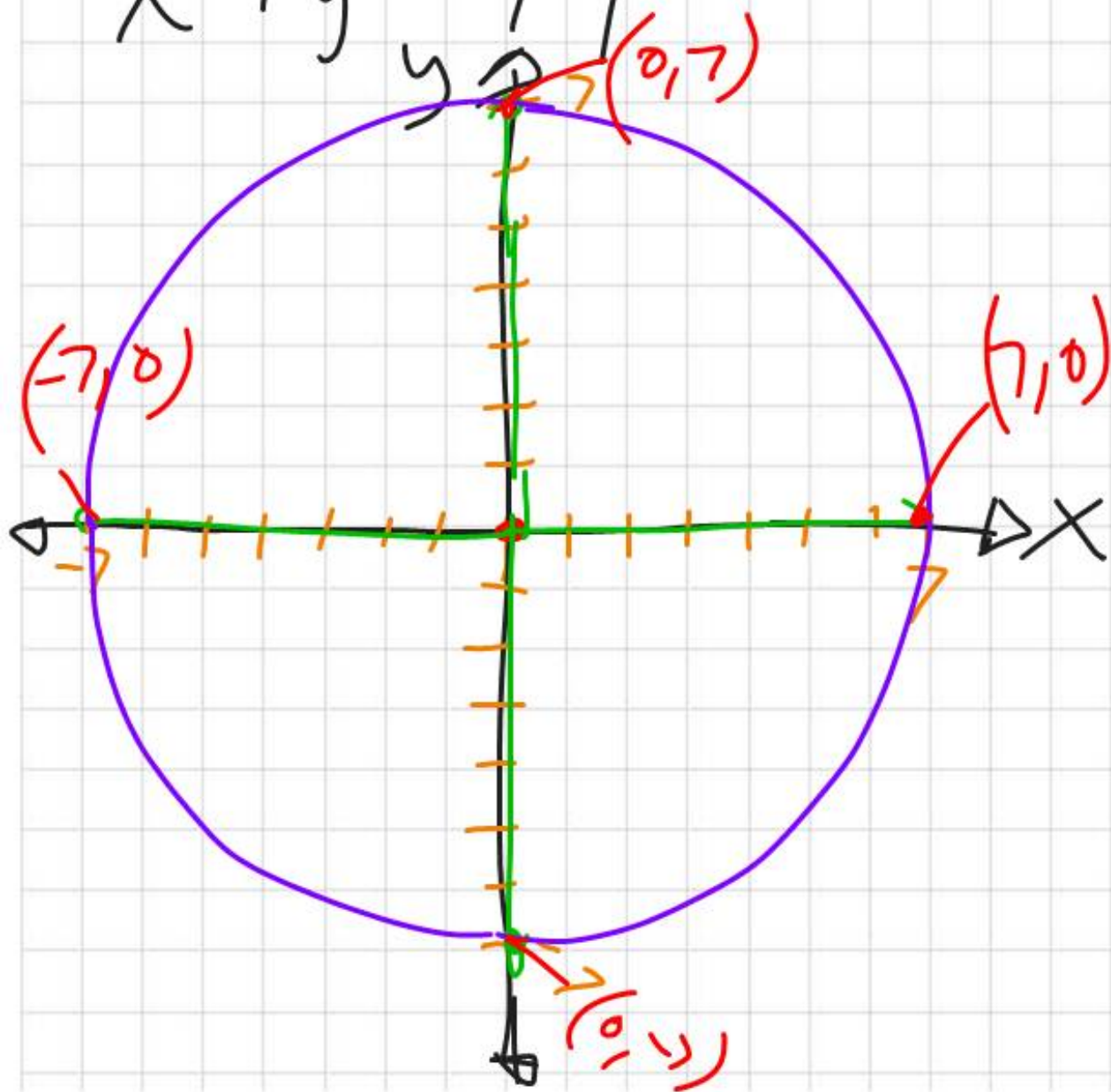
□ Center: (0,0)

□ radius = 7

$\frac{x\text{-int}}{}$	$\frac{y\text{-int}}{}$
(7,0)	(0,7)
(-7,0)	(0,-7)

SKETCH:

$$x^2 + y^2 = 49$$



SKGTLH:

$$(x-5)^2 + (y-4)^2 = 16$$

□ Center: (,)

□ radius =

<u>x-int</u>	<u>y-int</u>



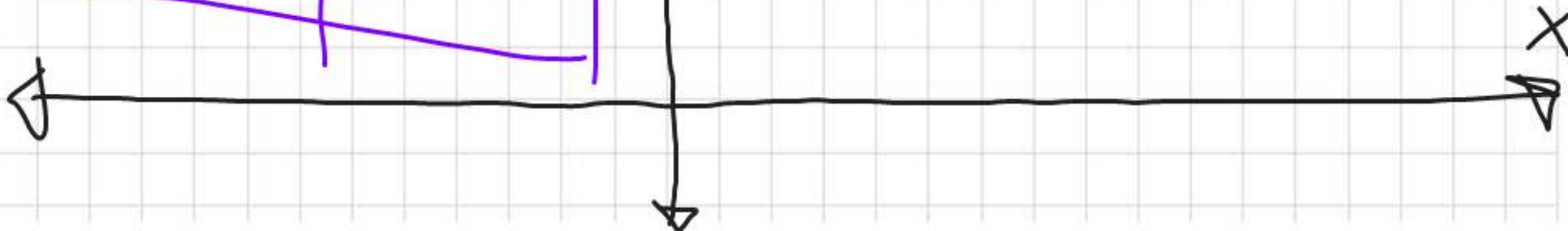
SKGTLH:

$$(x-5)^2 + (y-4)^2 = 16$$

□ Center: (,)

□ radius =

<u>x-int</u>	<u>y-int</u>



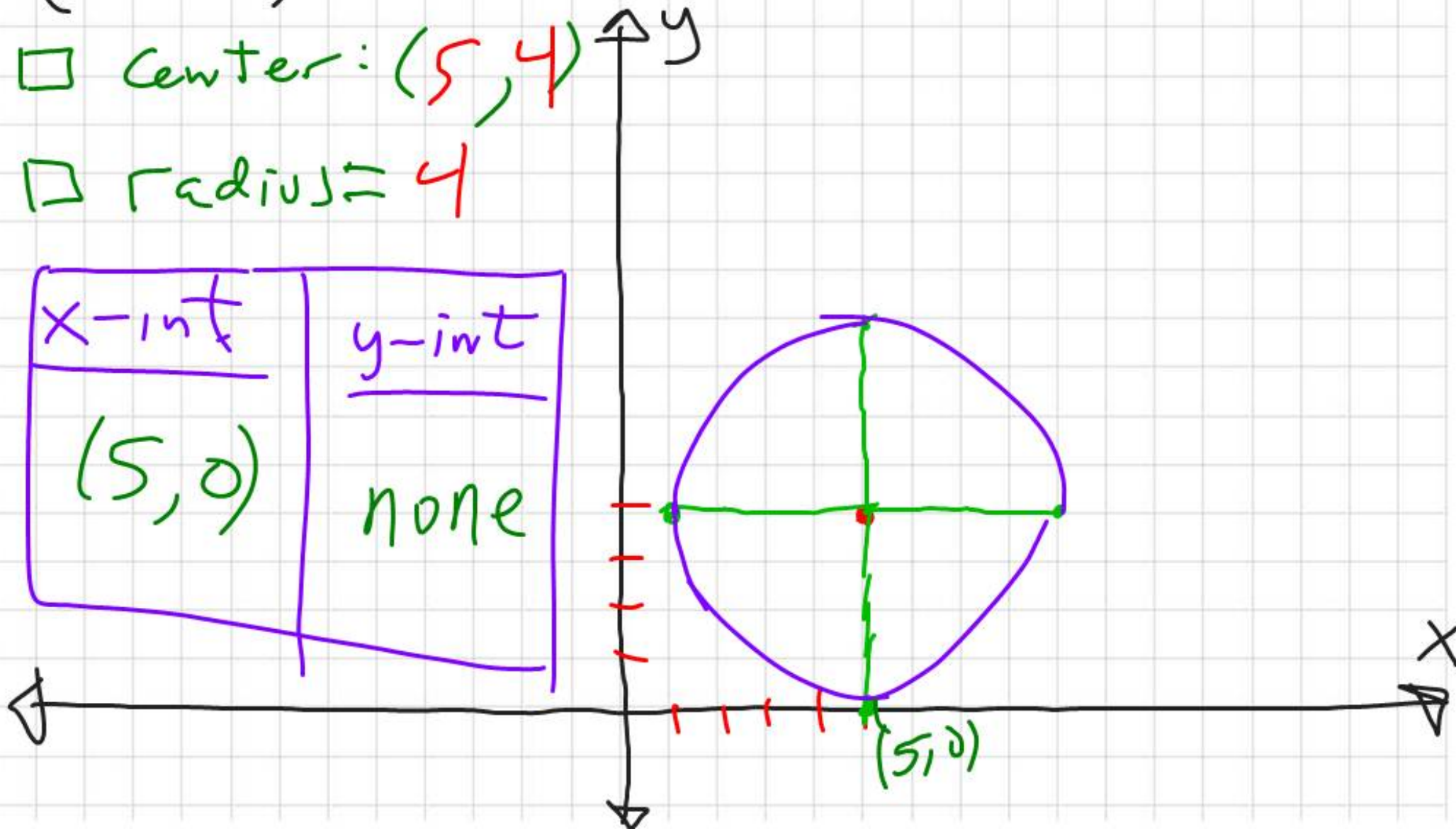
SKGTLH:

$$(x-5)^2 + (y-4)^2 = 16 = (4)^2$$

□ Center: $(5, 4)$

□ Radius = 4

x-int	y-int
$(5, 0)$	none



Sketch

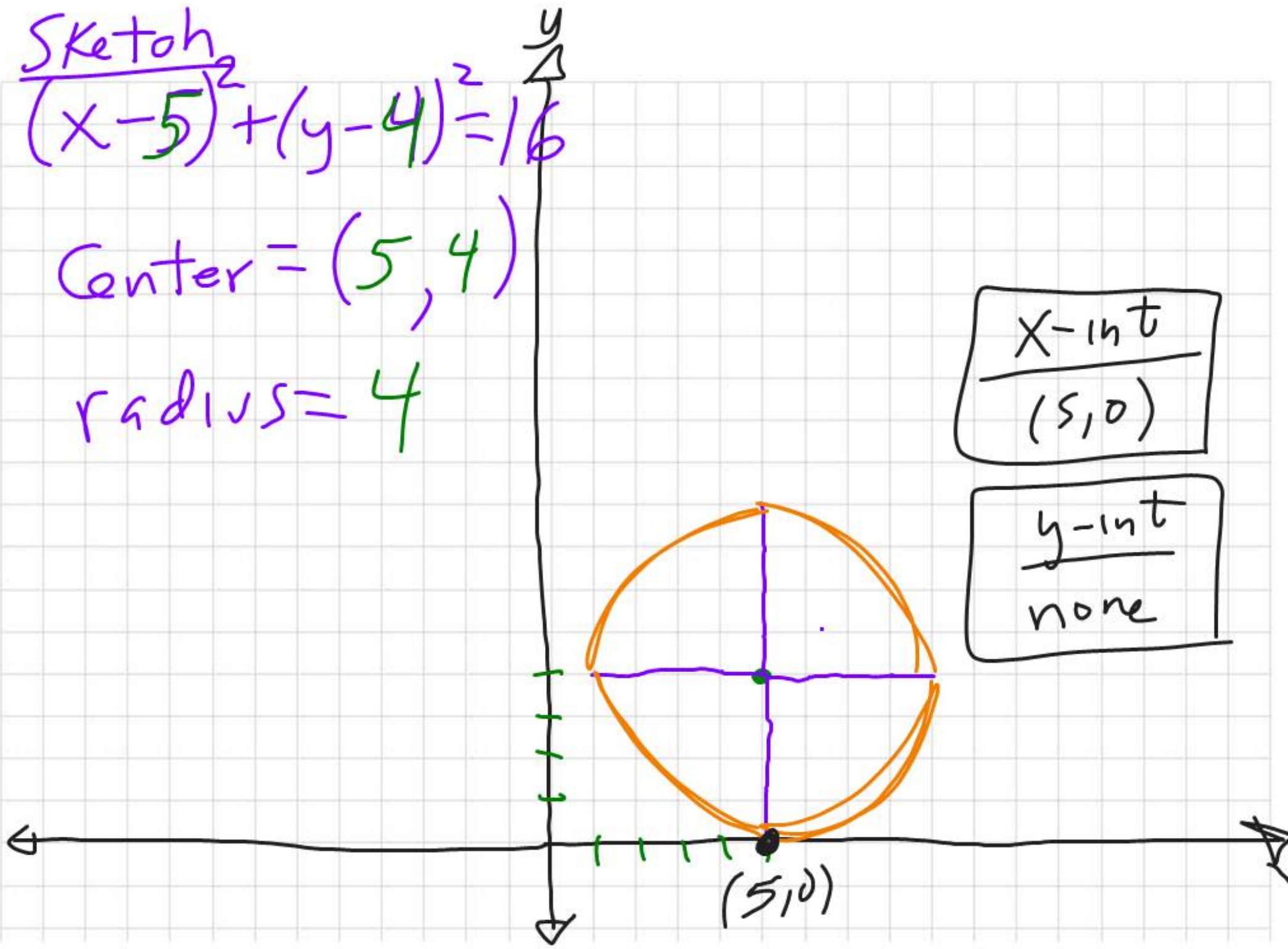
$$(x-5)^2 + (y-4)^2 = 16$$

Center = (5, 4)

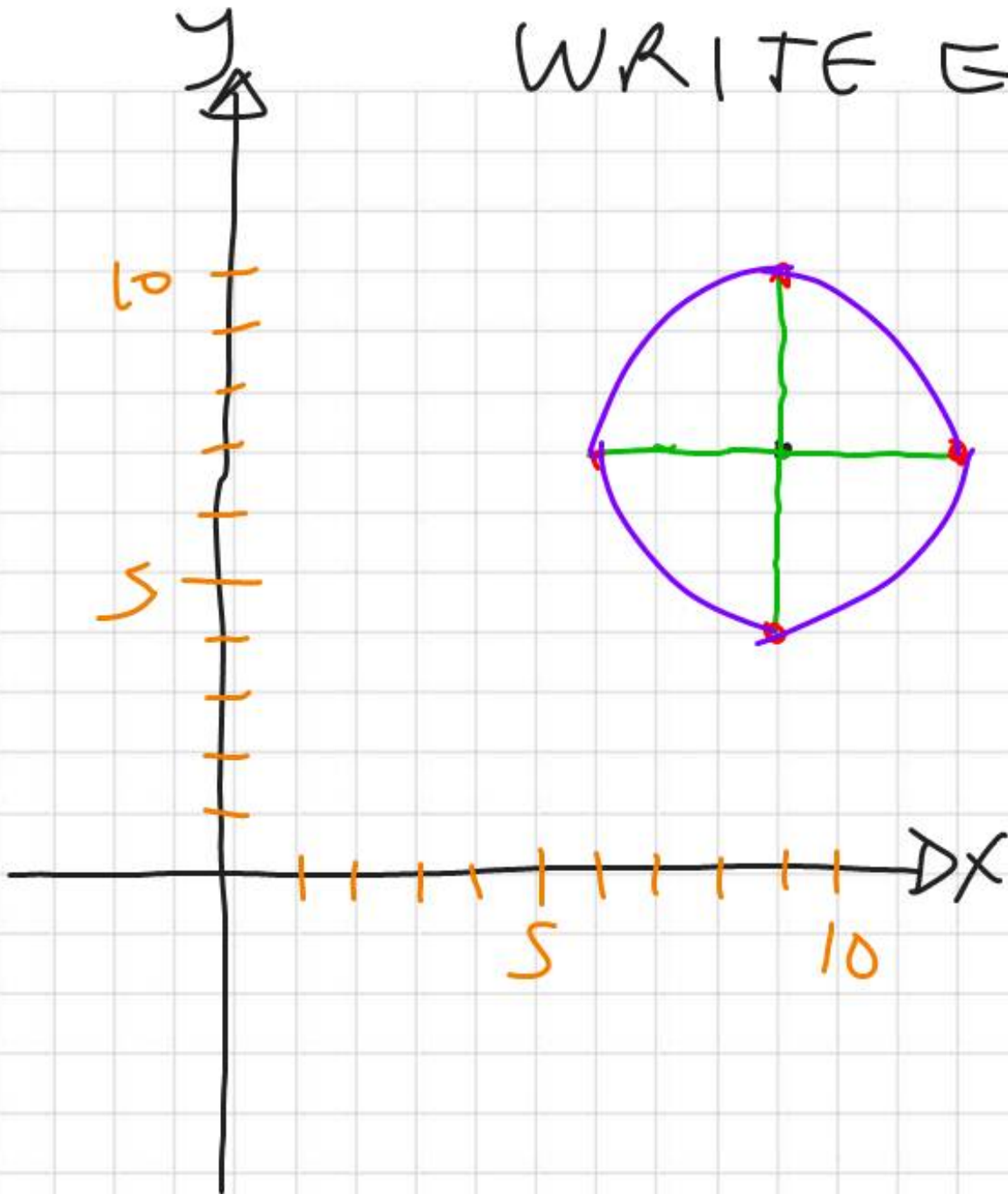
radius = 4

$x\text{-int}$
$(5, 0)$

$y\text{-int}$
none



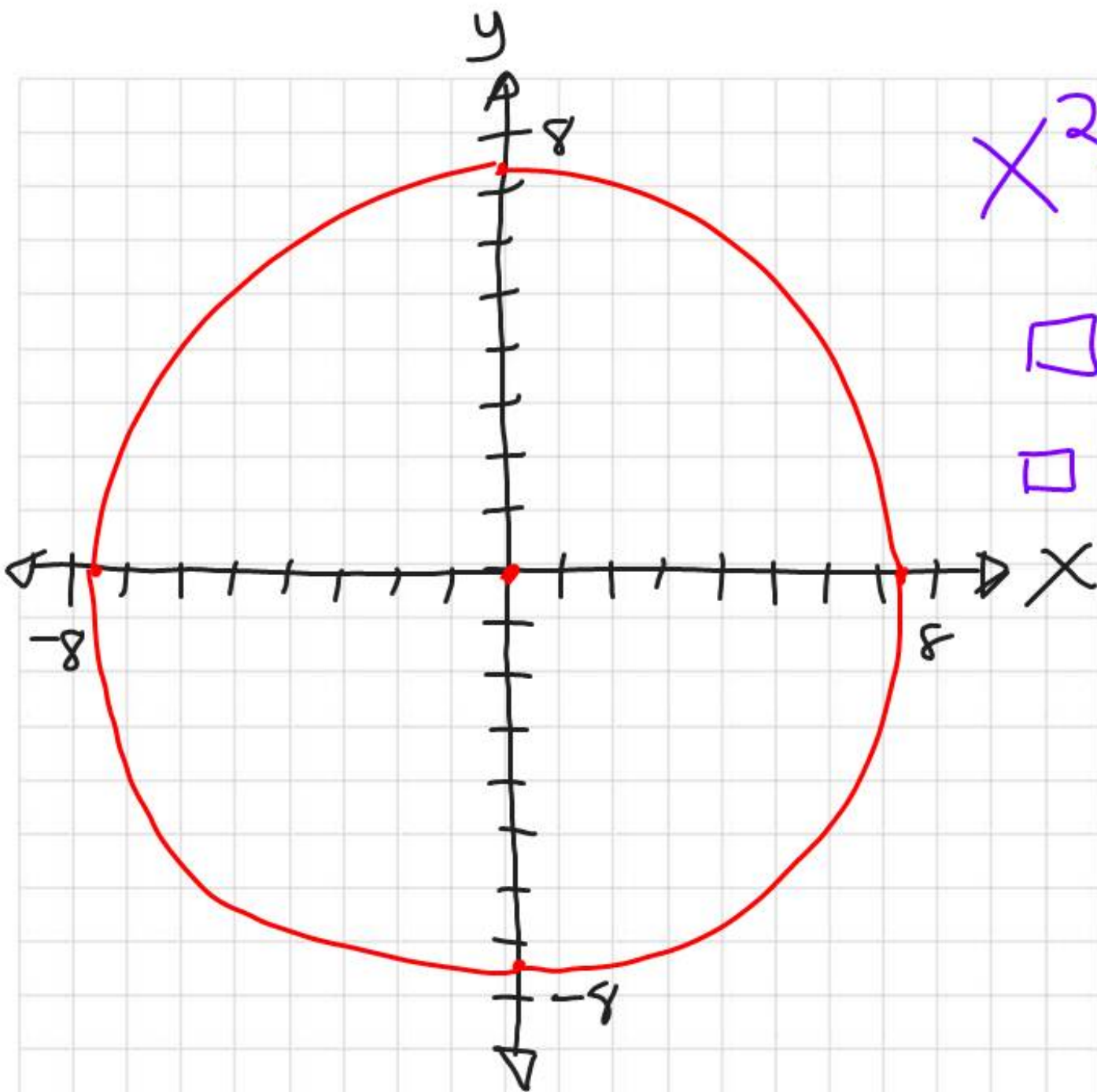
WRITE EQ. of Circle



□ Center: $(9, 7)$

□ radius = 3

$$(x-9)^2 + (y-7)^2 = (3)^2$$



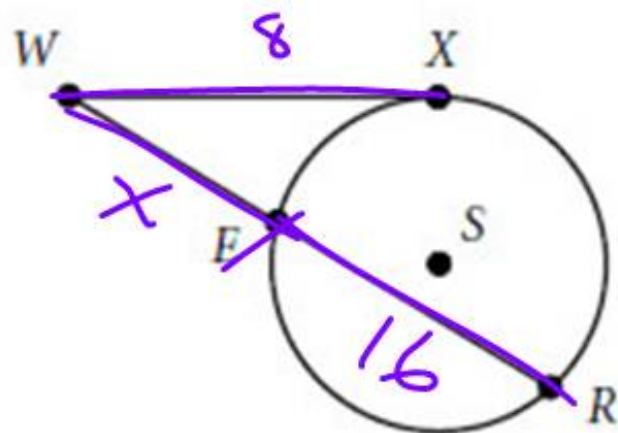
$$x^2 + y^2 = 55$$

□ Center: (0,0)

□ radius = $\sqrt{55}$
 ≈ 7.42

Refer to $\odot S$ for Exercise 9

\overline{WX} is a tangent and \overline{WR} is a secant to $\odot S$.



9. If $ER = 16$ and $WX = 8$, find WE .

$$(8)(8) = (x+16)(x)$$

$$64 = x^2 + 16x$$

$$0 = x^2 + 16x - 64$$

$$x = 8\sqrt{2} - 8$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = 1$$

$$b = 16$$

$$c = -64$$

$$x = \frac{-16 \pm \sqrt{16^2 - 4(1)(-64)}}{2}$$

$$x = \frac{-16 \pm 16\sqrt{2}}{2}$$

$$x = -8 \pm 8\sqrt{2}$$

